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ABSTRACT

Several factors have been involved in elevating education as a prime issue of national concern. One such factor has been the advent of new technologies; another has been the report by the National Commission on Excellence which found a steady decline in Scholastic Aptitude Test scores, an increase in adult illiteracy, selection of nonrigorous academic studies by students, grade inflation with course content deflation, and people leaving the teaching profession. As a result of these findings, the Commission has called for the strengthening of state and local high school graduation requirements for English, mathematics, science, social studies, and computer science. The Office of Educational Research and Improvement (OERI) in the U.S. Department of Education is implementing programs using technology to improve teaching basic skills and using educational television to teach science. Federal grants have been awarded to various projects investigating the use of technology to offer training in an alternative occupation in high technology for secondary schools, to improve mathematics and reading skills, to develop computer managed instruction, to offer computer science courses for learning disabled and handicapped students, and to establish a Center for Technology to conduct research. The last project has been the Reagan Administration's encouragement to schools to become involved with and share information on instructional technology, and to get the private sector more involved in instructional technology. (DJR)

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"The Challenge of Excellence in Education Through Technology"

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Donald J. Senese

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Good Morning.

It is indeed a pleasure to be here this morning to address a topic of growing interest and concern in the field of education--technology

Until recently, it has been for the most part educators---classroom teachers, school administrators, college and university professors responsible for teacher training, and sometimes a few parents of students in the schools--who have been concerned with education. Today, we find that situation changing and changing rapidly. Education is becoming a matter of interest to everyone; it is an issue of vital concern to all Americans.

There are several reasons why education is coming off the "back burner". One of them is the rapidly changing technologies which are now, and will even more so in the future, affect what we teach and the way we teach it. There are many and varied opinions about the role of education and the educator in the "information age".

More and more educators are beginning to recognize the great potential of technology to enhance learning of students, increase teacher productivity, and produce more effective schools. Cognizant of the current national debate over "master teachers" and merit pay at the elementary and secondary level, there is a growing focus being placed on the outcome of our educational system. Simply stated, the question is being raised, 'What can we do so that teachers, students and schools do a better jobs?'

How we approach the educational challenges which face us today will determine, in a very real sense, the quality of life and the ability to be productive citizens for those students now in school as well as those who will follow. It will perhaps even determine the ability of our nation to survive.

Another factor in the rise of education as a prominant issue has been the release of the report by the National Commission on Excellence in Education. The Commission was appointed by U.S. Secretary of Education, Terrel H. Bell. The job of the Commission was to review and report on the status of education across the nation.

The report which came out was like a firebell in the night--awakening our generation to a sudden and real danger. The Commission members, representing a wide variety of backgrounds and philosophical viewpoints, issued a unanimous report. They found an educational system in deep trouble. We were schooling many but really educating few. The sense of seriousness, alarm, and concern was reflected in the very title of the report A Nation At Risk: The Imperative for Educational Reform.

Allow me to read some of the more alarming comments from the beginning of the report:

> "Our nation is at risk. Our once unchallenged preeminance in commerce, industry, science and technological innovation is being overtaken by competitors throughout the world--the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people. What was unimaginable a generation ago has begun to occur--others are matching and

> surpassing our educational attainments---We have, in effect, been committing an act of unthinking, unilateral educational disarmament.

Our first reactions as educators might be to go on the defensive. We can deny the conclusions, blame others for this situation, or make excuses. First of all, the report presents compelling evidence for its conclusions. Second, we can blame others and I am sure we would all have our favorite targets but I am also convinced there is plenty of blame to go all around. And finally, we could plead exceptional circumstances-- we are educating more children now in our system than years previous, we are giving greater opportunities for less favored groups in our population, and we are offering a greater variety of choice to students.

These excuses ring hollow as we examine the need to give all children a quality education. Excellence and equity need to go hand-in-hand, not as separate or adversial goals. How do we benefit the poor and minorities by giving them a substandard education in the name of equity and fairness? Anything worth doing is worth doing well and our educational system must perform better.

Too often we have seen our educational system deteriorate from teaching the three R's (reading, 'riting, and 'rithmetic) to teaching the six R's--remedial reading, remedial 'riting, and remedial 'rithmetic. Isn't it amazing that we have so much time to devote to these remedial activities and not enough time to teach it correctly in the first place?

The fundings of the Commission were hardly a surprise to educators who have perceived these trends over the past few years. The same alarming trends were confirmed by other reports which were issued subsequently: The Action for Excellence report of the Task Force on Education for Economic Growth by the Education Commission of the States, the Report of the Twentieth Century Fund Task Force on Federal Elementary and Secondary Education Policy, and America's Competitive Challenge: The Need for A National Response, of the Business-Higher Education Forum.

These reports issue a clarion call to all of us to assess where we have been in education, where we are presently, and where we should be going. We realize that education is costly but ignorance is even more costly for a nation. We need to realize that money alone--$11 billion or $15 billion proposals--cannot resolve the problem. In fact, an excessive infusion of money could do more harm if it merely allows us to make the same mistakes with more resources. We not only need to do things better but we must do things differently.

I would like to identify a few of the problems.

Signs of a decline have been evident over the past decade or two. For example, we have witnessed a steady decline in the Scholastic Aptitude Test (SAT) scores of students. Although last years scores showed a slight increase for the first time in many years, it is too soon to tell whether or not that upturn indicates a reversal in trend or a fluke.

We have seen a growing number of students, completing not only elementary and secondary school but college as well, who cannot properly read and write. We find industries having to spend valuable resources to improve skills of workers which should have been developed in our nation's schools. One of our recently discovered problems is adult illiteracy. These millions of adult illiterates are products of our schools.

We have seen students taking easy courses--sometimes referred to as "lifestyle courses"--in place of rigorous academic studies. These courses neither challenge them intellectually nor prepare them for the increasingly complex, technological world.

We have seen grade inflated at the same time as courses have been deflated in content. We have witnessed the superfluous replacing the substantial in our school curriculum. Are we really gaining anything when courses such as "bachelor living", "consumer math" and "problems of democracy" have replaced English, geometry, and history as essentials in our schools? We have offered our students in the name of democratic education a cafeteria approach in education where the choices are heavily weighed in favor of desserts and tilted against the more nutritious foods, the meat and potatoes. A mind is a terrible thing to waste!

We have seen many of our brighter people in the teaching profession leaving. The replacements are, in many cases, those who lack the goal of excellence in education. A recent study revealed that while the ability of students entering the teaching profession has been declining,

the grades of education majors are among the highest grades in the departments of our colleges and universities. Education majors average higher grades than majors in business, liberal arts and engineering. These education majors, insignificantly challenged and treated lightly, develop a pattern in which their students are treated similarly. Excellence in education is directly related to excellence in teaching. A challenging teacher can change the perception of the learning process for the student from one of tedium and ritual to one of excitement and adventure.

You are all involved in education. You know that some things are right with American education and some things need improving. The report by the National Commission on Excellence in Education provides an impetus for not only those who have careers in education but the public at large to focus on improving education.

There has been a lot of interest generated by the report and the recommendations of the Commission. If it has done nothing else, it has created a renewed interest in education and brought it to the forefront of issues facing us today.

This is very positive for education. It will hopefully lead to the improvements which are so desperately needed.

Although results may take time, the interest which has been generated can, and I think will, lead to some very beneficial results in the education of our young people.

One recommendation of the Commission which is pertinent to our discussion here today is related to State and local high school graduation requirements. The Commission is calling for the strengthening of these requirements and states:

> ...at a minimum, all students seeking a diploma be required to lay the foundations in the Five New Basics by taking the following curriculum during their 4 years of high school: (a) 4 years of English; (b) 3 years of mathematics; (c) 3 years of science; (d) 3 years of social studies; and (e) one-half year of computer science. For the college-bound, 2 years of foreign language in high school are strongly recommended in addition to those taken earlier.

I believe it is especially significant that a recommendation is made for computer science. Computers are beginning to have a vital role in the educational arena; it is inevitable that that role will continue to grow at an ever increasing rate. It is significant to note that the Commission feels that it is already important enough for every student receiving a high school diploma to have at least one half year of computer science. Even those of us who have championed the liberal arts recognize that there is such a thing as a "new liberal arts". The concept of a liberal education has focused on education as serving the inner being of the individual and the spirit of society rather than just material needs; it caters to the human urge to understand the world in which the individual finds himself rather than give in to an animal need to exert some control over the world. Stephen White, Director of Special Projects for the Alfred P. Sloan Foundation, notes that the

computer is beginning to do for the mind of man what the engine did for the muscle of man:

> The engine permitted man to manipulate matter in great bulk and at great speed; the computer permits man to manipulate data with the same extraordinary facility.

Thus the "new liberal arts" require a knowledge of "technology" and "analytical skills". For the teacher in any field, as well as the poet, the artist and the philosopher, live in a world in which they must deal with data during the dawning of an "information society". And such innovative institutions as Carnegie-Mellon University expect that almost every one of their students by 1986 will be working on a computer not just in math and engineering but in drama, music, history and writing. We all know that the technology revolution is not in the future; it is here now.

Instructional technology offers us a great opportunity to improve education. We must not treat it as a fad or game but as a tool tied to quality and excellence in education.

During a National Teleconference on Educational Technology held on June 22, 1982, in Washington, D. C. Secretary Bell announced that technology would be one of his lead initiatives in education. There were over forty-five state sites, including the one in D.C., that participated in two days of activities highlighting technology in education.

The Office of Education Research and Improvement was selected by the Secretary to take the lead in implementing his initiative on technology. OERI has become involved with a number of interesting and exciting educational programs.

Our Center for Libraries and Educational Improvement is monitoring several contracts which utilize technology to improve the teaching of the basic skills. One of these is a communication program known as Project Quill. It uses a set of microcomputer-based programs around which several instructional activities have been developed. The activities are geared to young writers in grades 3 to 6. Quill utilizes the microcomputer's technological capabilities to help teachers teach writing. The youngster's natural enthusiasm for anything connected with the computer strongly motivates them to write and to perform the various tasks which are a part of the program. It has helped to eliminate the drudgery of rewriting compositions by hand. Corrections and rewrites can be made quickly on the word processor and a print-out secured. In addition we are also supporting studies focusing on the use of computers to teach math and science.

We are also using technology, educational television, to teach science through such programs as the "Voyage of the Mimi" and, in cooperation with the National Science Foundation, "3-2-1 Contact".

Our National Center for Educational Statistics has completed surveys showing the growing use of computers in the schools.

The National Diffusion Network, also under OERI, identifies exemplary programs and assists schools to implement them. Under Secretary Bell's leadership, the NDN initiated "Lighthouse Projects". As a result of the current emphasis on technology, the National Diffusion Network has awarded grants to ten "Lighthouse Projects" in Technology. The Lighthouse Projects are designated as such because they

are using technology to enhance education in an outstanding way. The federal grants will enable those schools to host visitors from all over the country and to provide material on their adaptations of technology to school use.

Five are already in operation. These projects are Project C.O.F.F.E.E. or the Cooperative Federal for Educational Experiences, Oxford, Massachusetts; The Merrimack Education Center in Chelmsford, Massachusetts; Asbury Park, New Jersey, Board of Education; The Evaluation Center, Hopkins Public Schools, Hopkins Minnesota; and Project HOSTS (Helping One Student to Succeed), Vancouver, Washington. These projects focus on a variety of uses of technology including an alternative occupation in high technology for secondary school age students, improvement of math and reading skills, and management of student records with cross-referencing information about prescriptive instructional material which can be used to help save time and address skill deficiencies of students.

We have added five more and I would like to mention these:

- Project READ:S or the Reading Education Accountability Design: Secondary (Idaho) is a comprehensive secondary level (grades 7 to 12) reading program with a computer assisted component. It utilizes motivations and technological advantages of the microcomputer in the direct instruction, reinforcement, in-service training of teachers, and the management processes which are integral to the reading program itself.

- Project CUE or Computer Utilization in Education (New York) is a criterion-referenced reading and mathematics curriculum offered in a laboratory setting which utilizes computer assisted instructional applications as the primary instructional methodology by which remedial services are provided.
- MATH/TECH (California) is a mathematics project which systematically integrates the microcomputer into the 7-12 grade classroom utilizing an easy-to-use curriculum which supplements and parallels the traditional 7-12 grade mathematics curriculum.
- RECIPE or Research Exchange for Computerized Individualized Program for Education (Florida) is a program for learning disabled children in grades K-6. It is an objective based instructional and computer management system that assists these students in mastering specific objectives in the basic skills areas of reading, mathematics, and writing.
- Project CAISH or Computer Assisted Instruction and Support for the Handicapped (Arkansas) is targeted at ninth grade students. It is an approach which attempts to provide a basic level of literacy and competency in computer science through hands-on experience, as well as providing aptitude and interest the opportunity to develop higher level skills in computer science and programming.

We have been moving along in other areas as well.

Our National Institute of Education has an RFP out to establish a Center for Technology which will do research on technology as well as provide services here in New England.

We have an RFP out through the Secretary's Discretionary Fund which will award $1.6 million dollars for eight school based demonstration projects. These projects will allow schools to identify learning objectives and devise uses of technology to achieve these objectives.

Throughout regional offices, OERI has provided grants to assist programs for teachers in computer literacy.

I am sure these will provide outstanding examples--and new uses of technology--which can benefit all schools. We at the Federal level are not dictating a program but believe the creativity and ingenuity exists out there in local school districts. We seek to provide some assistance so other districts can learn from the experience of leaders and innovators in this field.

OERI brought together forty top experts at a conference held at Carnegie-Mellon University and the University of Pittsburgh last November. The conference was an exceptional experience as these leading scholars explored the key research areas needed in using computers in mathematics, science, reading and writing. The report, due to be published soon, will become a cornerstone for identifying research into instructional technology.

The Reagan Administration has a positive view of our educational system. The federal role in leadership in education is an important role but it is nonetheless a limited one. There are no plans to return to the type of programs offered in the 1960's in which large sums of federal monies were spent on a wide range of educational projects, some of little value. An excessive amount of federal aid could have a negative effect. We do not intend to provide an opportunity for computer companies to unload unneeded and outdated hardware on school systems or to get into controversial areas as curriculum development, which may not meet the needs of schools throughout the country. In fact, a federal aid program might at this stage cause overinvestment and excessive development in certain fields.

We are not only entering a new age in technology but a new age in educational responsibility and decision-making. The Reagan Administration, particularly through the Education Consolidation and Improvement Act (ECIA) or block grant approach, has been turning decision-making authority and finances back to the States and local school authorities. The purpose has been to reduce federal control while enhancing the decision-making process at the State and local level. We have been particularly pleased to note that the school districts have taken the opportunity to spend block grant money on acquisition of technology.

Instead, the Reagan Administration, is trying to stimulate an atmosphere which encourages schools to get involved with instructional technology, to share information on technology, and to get the private

sector more involved in instructional technology. We have been particularly pleased with outstanding examples throughout the country of business-school partnerships designed to improve education.

All of us are experiencing a period of limited resources. Business partnerships can assist us to make up that gap. A hard look at priorities in local budgets may require us to shift resources from other projects to our schools. Technology does offer us the opportunity to utilize cost savings with better equipment to improve education.

We in education face a great challenge and none greater than those of us in the field of technology. We are on the cutting edge of a revolution which will change every aspect of society. Time magazine named the computer as its "Man of the Year'. Newsweek magazine featured a story recently on the race between the United States and Japan to build a supercomputer. More and more articles are focusing on the Fifth Generation Computer and artificial intelligence.

John Nesbitt, author of Megatrends: Ten New Directions Transforming Our Lives notes:

> "As we move from an industrial to an information society, we will use our brain power to create instead of our physical power, and the technology of the day will extend and enhance our mental ability".

All of you have the opportunity to play a key role in that change as we go about improving education. In that last line of Nesbitt's book, he makes the comment:

> My God, what a fantastic time to be Alive!

Well, it is! I wish you the best of luck in making the best of this fantastic time.